NOTES FROM PACIFIC COAST OBSERVATORIES

A Contrast in Stellar Distribution

A remarkable contrast in stellar distribution is shown in Plate VIII, facing this page.

Each half of the cut is half a degree on a side, so that the area of each part is 0.25 of a square degree. The area subtended by the disk of the full Moon, at its mean distance, is 0.21 of a square degree. Both plates were taken with the Crossley Reflector; the exposures were 1^h50^m in each case. The photographic enlargements from which the cuts were engraved were made by Mr. Carl Bergmann.

The upper portion of the plate shows a region of the Milky Way at 18^h4^m right ascension and $27°30'$ south declination. This is one of the densest regions of the Milky Way thus far photographed with the Crossley Reflector. Counts on a number of small areas scattered over the plate indicate that there are at least 76,000 stars in the area covered by the cut. The very faintest stars in places form an almost continuous background which is lost in the reproduction.

The lower portion of the plate shows a starless region to the southeast of θ *Ophiuchi*, at 17^h24^m right ascension, and $25°30'$ south declination. In this area of one-quarter of a square degree there are only 124 stars.

The two regions are a little more than nine degrees apart. It is very probable that the stellar desert shown in the lower cut is due, at least in part, to the presence of occulting matter.

Heber D. Curtis.

The Variation in Sun-Spot Activity During the Present Cycle

The sun-spot activity during the present cycle has been very typical in character, the variation represented in the lower curve of the figure showing very well the remarkable similarity to the light variation of Cepheid variables. In this curve the ordinates are the number of spot groups observed during three months, the open circles showing the number for the individual quarters and the black dots the average number observed quarterly during a whole year. A group has been counted as new when it appeared

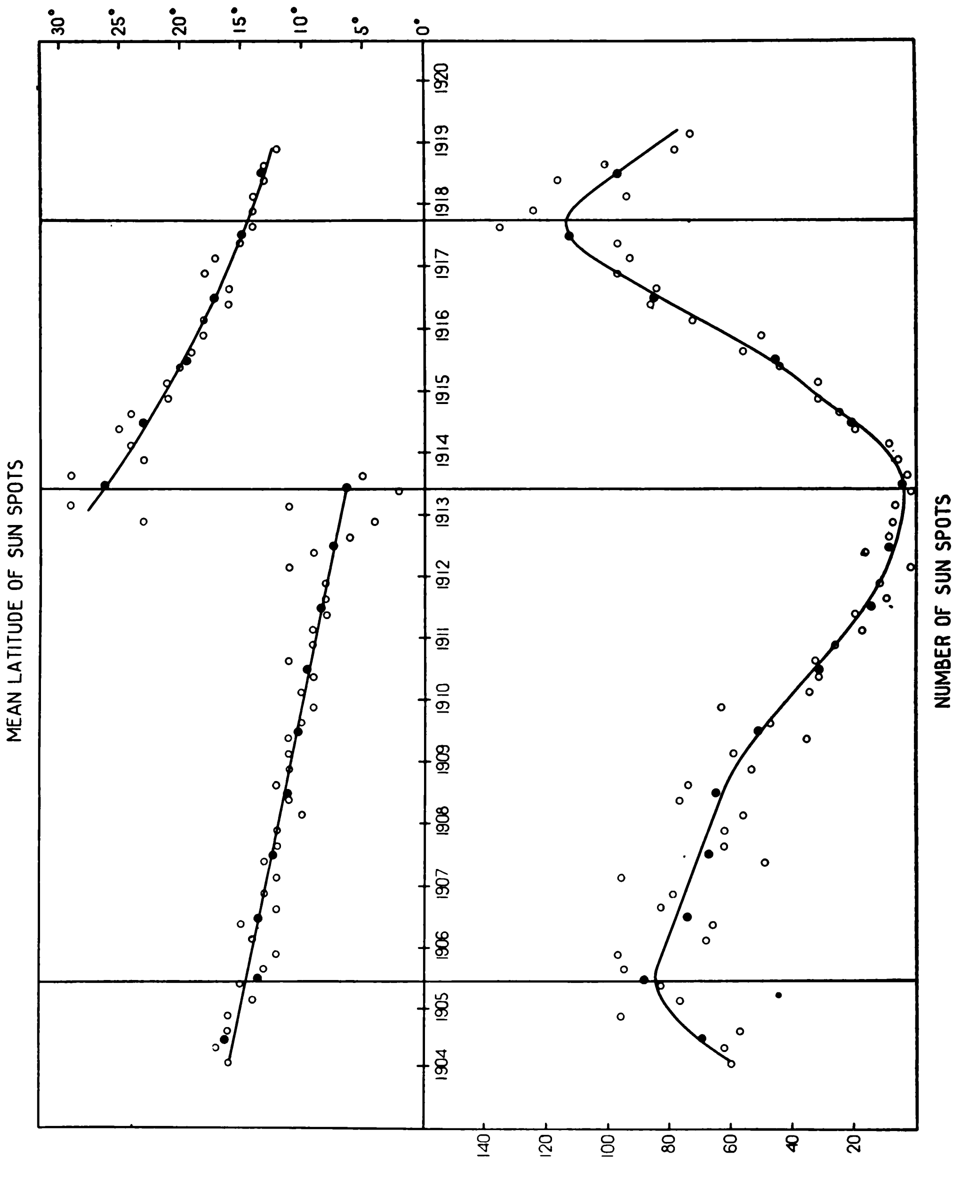
on the eastern limb so that recurrent groups have been counted once for each revolution of the Sun in which they were observed. The number of spots from 1904 to 1915 has been taken from the Greenwich observations, and since 1915 from the records of the Mount Wilson Observatory.

The period of the last cycle as indicated here was about 12.5 years, which is somewhat longer than the average for the last few cycles, the time from maximum to minimum being about one year greater than the average. This was due principally to a rather prolonged minimum altho it comes in part from the time assigned for the 1905-1906 maximum, several observers having placed it later than indicated here. This may be due to the different method of measuring spot activity, the average daily "Wolf number" or the mean daily "spotted area" being the usual gauge of activity.

Maximum occurred about August, 1917, the most active quarter being July, August and September, 1917, during which time one hundred and thirty groups were observed. The activity was appreciably greater than during the maximum of 1905-1906. The decline apparently has been rather rapid, January, February, and March of this year giving only ninety-three groups. However, the variation of individual quarters from the mean curve is large and an increase of activity for a few months, of which there is evidence, would raise the mean curve considerably.

The upper curve of the figure shows the variation in the mean latitude of the sun-spot zone. Open circles indicate the average latitude of spots during a quarter of a year, the black dots the average latitude for a whole year. The decline in latitude toward the minimum and the revival of activity in high latitudes is a well-known characteristic. At any one time the sun-spot zone is several degrees wide (about 25 degrees). At minimum there are, of course, very few spots, so that the zones are not well marked, but there is distinct evidence of two zones, one with a maximum activity at about 27 degrees and the other at about 7 degrees latitude. It is interesting to note that at maximum activity the average latitude of sun-spots is about 14 degrees.

The past maximum was marked by two groups of remarkable size, each covering about 3300 millionths of the visible hemisphere of the Sun. The first of these, which appeared in February, 1917, was a bi-polar group of comparatively simple structure. The second large spot group, in August, 1917, was very complex and


MEAN LATITUDE OF SUN SPOTS
NUMBER OF SUN SPOTS
30°
25°
20°
15°
10°
5°
0°
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
140
120
100
80
60
40
20

appeared at a time when the Sun as a whole was extremely active. A photograph of the Sun showing this group somewhat past its prime was reproduced by Mr. Ellerman in the February number of these PUBLICATIONS (Plate I). The only rivals of these two huge groups, which have been observed during the past half century, were in February of 1892 and 1905, respectively.

SETH B. NICHOLSON.

NINETEEN NEW VARIABLE STARS

In the course of a study of the magnitudes of the southern globular cluster Messier 68 (N. G. C. 4590; R. A. = $12^h 34^m.2$, Decl. = $-26°12'$, 1900.0), a number of stars of the sixteenth magnitude were found by Miss Ritchie to vary in light. The following list gives the position of the variables with respect to the center.

POSITIONS IN VARIABLES IN MESSIER 68

Star No.	x	y	Star No.	x	y
1	−4′40″	+1′49″	11	+0′19″	−1′36″
2	−2 48	−0 45	12	+0 33	+1 10
3	−2 20	+1 31	13	+0 48	+0 8
4	−1 57	−2 11	14	+1 1	−0 22
5	−0 56	+2 50	15	+1 4	+6 20
6	−0 31	+0 40	16	+2 21	+2 3
7	−0 4	+3 38	17	+2 38	−0 44
8	+0 9	+0 58	*18	+6 20	+4 23
9	+0 11	+1 20	19	+7 20	+2 40
10	+0 16	−1 15			

Variable No. 18, one of the brightest stars in the cluster, appears to have a long period. All the others are probably typical cluster-type variables. Their amplitudes are of the order of one magnitude and their periods are short.

The median brightness of these short-period variables is between one and two magnitudes fainter than the brightest cluster stars, closely agreeing in this respect with the results for other clusters that contain Cepheid variables. A study of the light variations, therefore, will yield an accurate value of the parallax and absolute magnitudes for all the stars in the cluster. HARLOW SHAPLEY.

THE "NEW STAR" IN SERPENS, 7.1917

Two years ago, while photographing the position of the asteroid *Boliviana*, Professor Wolf found an image (magnitude 9.0 on the B. D. scale) that was not recorded on any of his plates prior to 1910 (*A. N.*, **204**, 293, 1917). Visual observations by Mündler and Wolf verified the star's existence but showed no variation in light. Later the designation 7.1917 was assigned to the object.